

Unit 3 Review

Date _____ Period _____

Transform the given function $f(x)$ as described and write the resulting function as an equation.

1) $f(x) = x^3$

compress vertically by a factor of 3
translate left 2 units

2) $f(x) = x^2$

expand vertically by a factor of 2
translate left 3 units

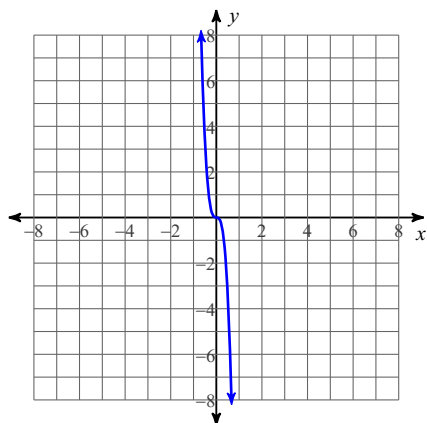
3) $f(x) = |x|$

reflect across the x-axis
translate left 2 units

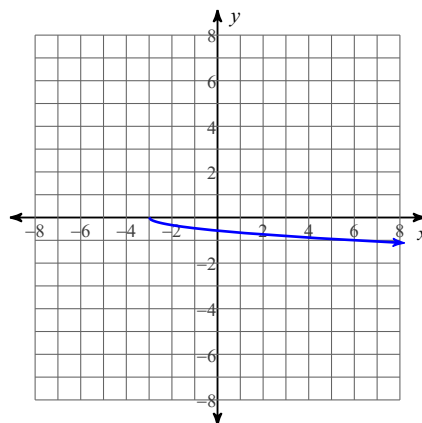
4) $f(x) = x^2$

compress horizontally by a factor of 2
translate right 1 unit**Identify the parent function $f(x)$ and write an equation for the function given.**

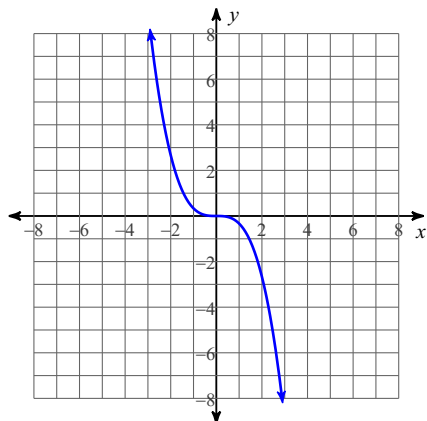
5)



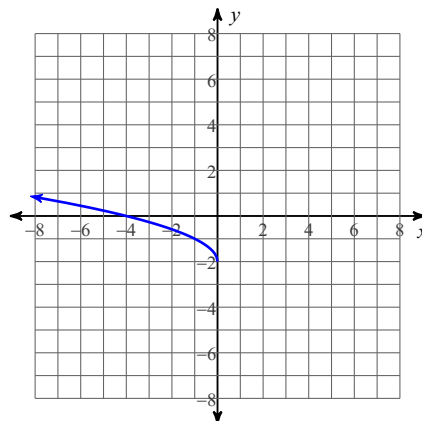
6)



7)

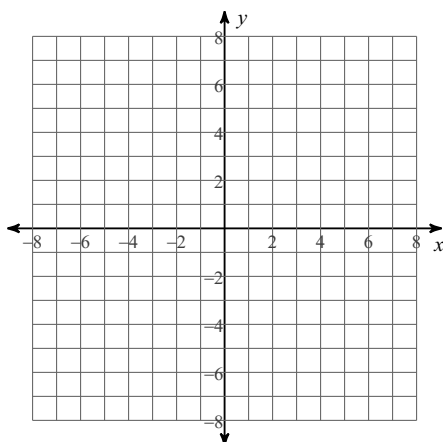


8)

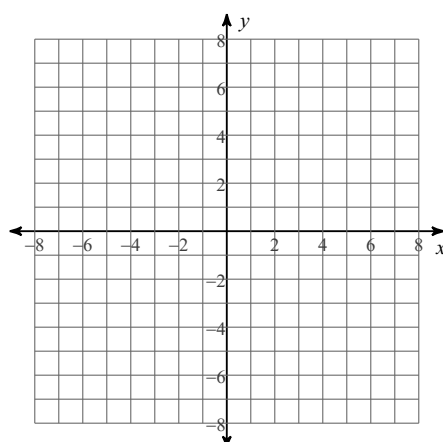


Sketch the graph of each function.

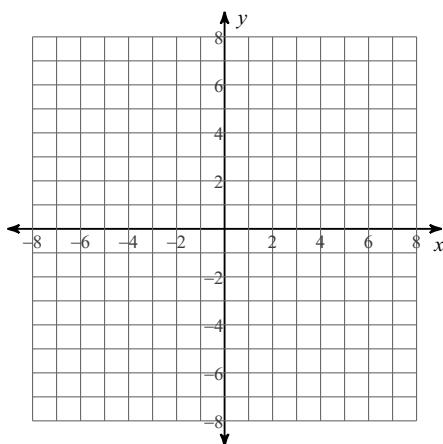
9) $g(x) = |3(x - 3)|$



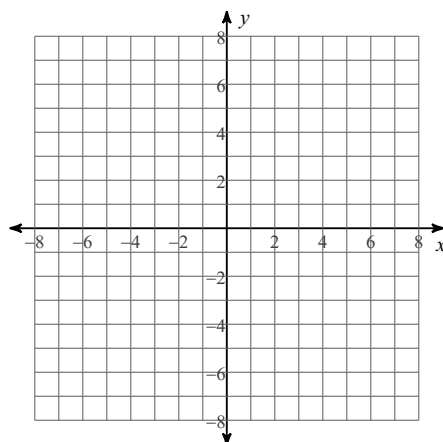
10) $g(x) = \sqrt{x + 1} - 2$



11) $g(x) = \frac{1}{x - 3} + 2$



12) $g(x) = |2(x - 1)|$



Describe the transformations necessary to transform the graph of $f(x)$ into that of $g(x)$.

13) $f(x) = |x|$
 $g(x) = \frac{1}{3} \cdot |x - 1|$

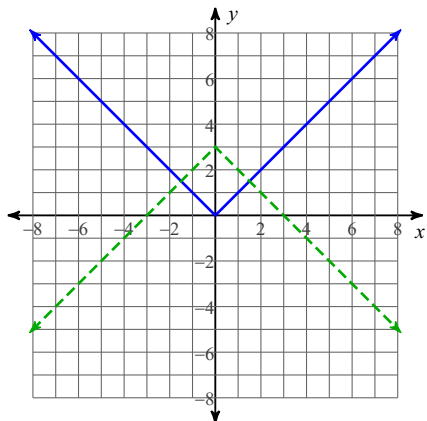
14) $f(x) = x^2$
 $g(x) = \left(\frac{1}{3}(x + 3)\right)^2$

15) $f(x) = x^3$
 $g(x) = -(x + 1)^3$

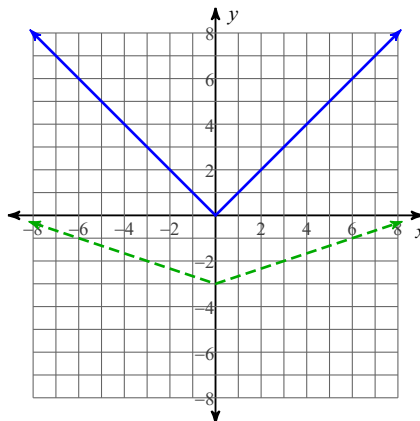
16) $f(x) = x^3$
 $g(x) = (3x)^3 + 1$

Write $g(x)$ (dashed line) in terms of $f(x)$ (solid line).

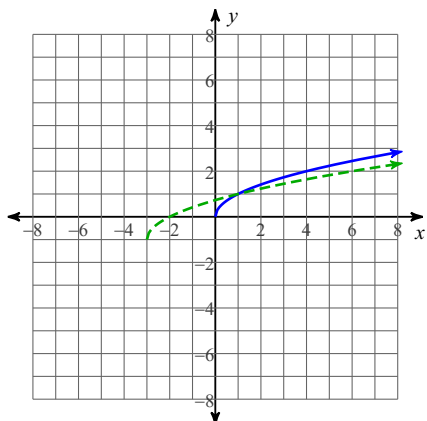
17)



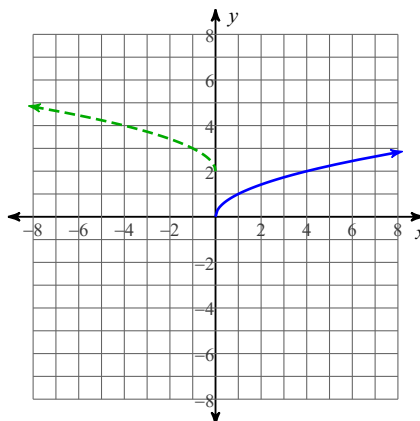
18)



19)

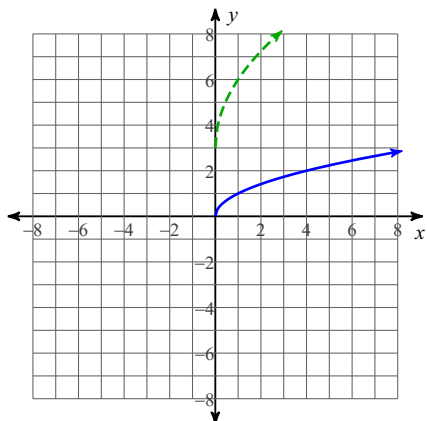


20)

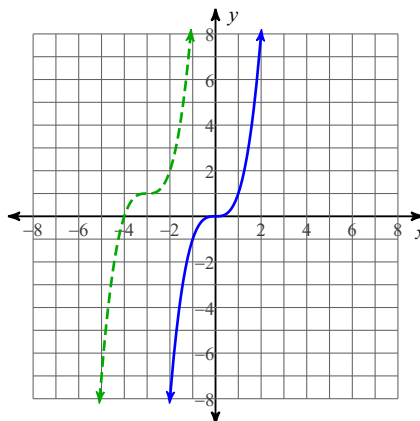


Describe the transformations necessary to transform the graph of $f(x)$ (solid line) into that of $g(x)$ (dashed line).

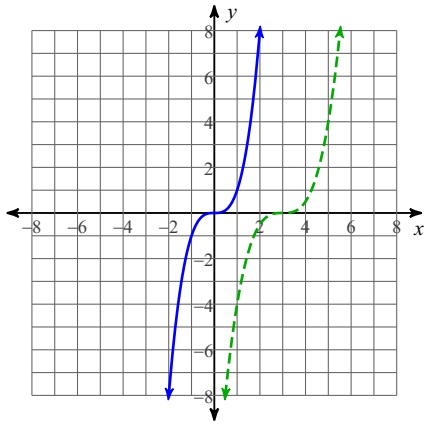
21)



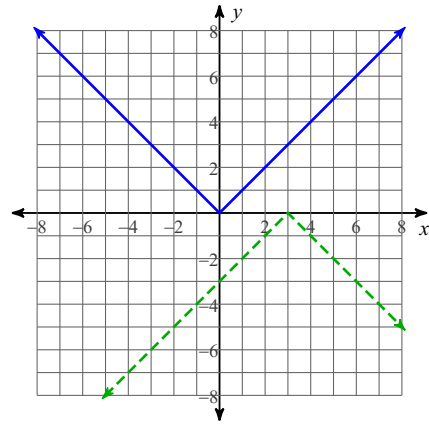
22)



23)

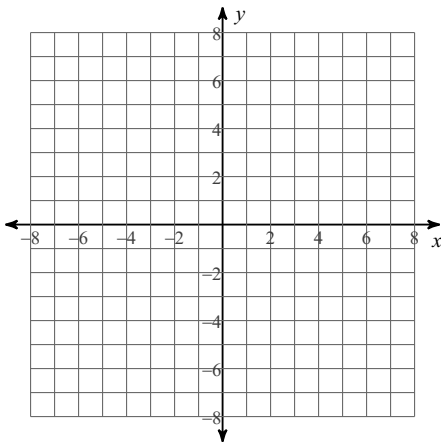


24)

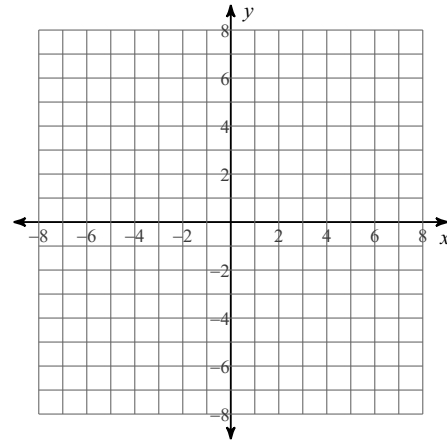


Sketch the graph of each function.

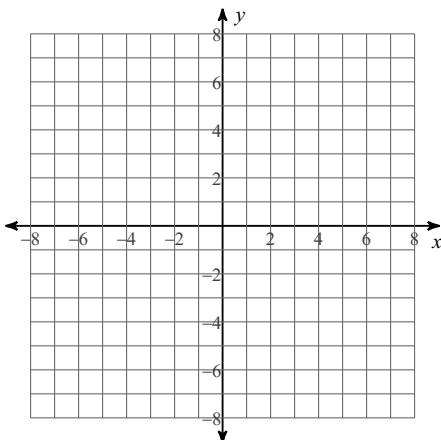
$$25) f(x) = \begin{cases} x + 3, & x < -3 \\ -4, & -3 \leq x < 4 \\ -6, & x \geq 4 \end{cases}$$



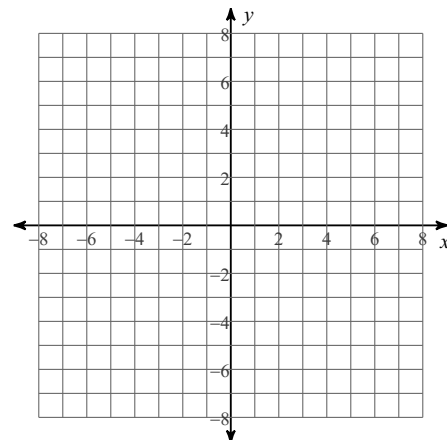
$$26) h(x) = \begin{cases} -|x|, & x < -1 \\ \sqrt{3x}, & x > 1 \end{cases}$$



$$27) h(x) = \begin{cases} (x + 4)^3, & x \leq -3 \\ 4, & -3 < x \leq 1 \\ (x - 1)^2, & x > 1 \end{cases}$$



$$28) f(x) = \begin{cases} -3, & x \leq -2 \\ (x - 1)^4, & x \geq 0 \end{cases}$$



Answers to Unit 3 Review (ID: 1)

1) $g(x) = \frac{1}{3}(x+2)^3$

2) $g(x) = 2(x+3)^2$

3) $g(x) = -|x+2|$

4) $g(x) = (2(x-1))^2$

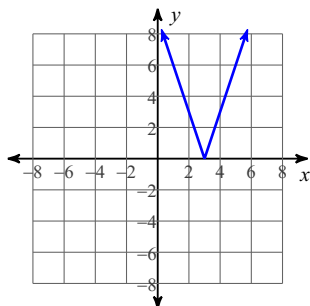
5) Parent: $f(x) = x^3$
 $g(x) = -(3x)^3$

6) Parent: $f(x) = \sqrt{x}$
 $g(x) = -\frac{1}{3}\sqrt{x+3}$

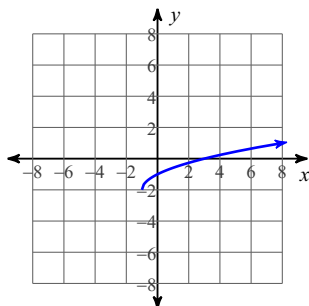
7) Parent: $f(x) = x^3$
 $g(x) = -\frac{1}{3}x^3$

8) Parent: $f(x) = \sqrt{x}$
 $g(x) = \sqrt{-x} - 2$

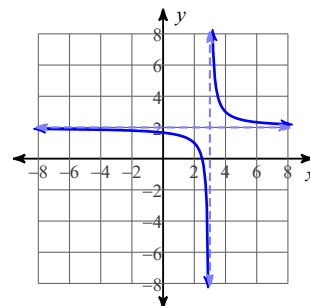
9)



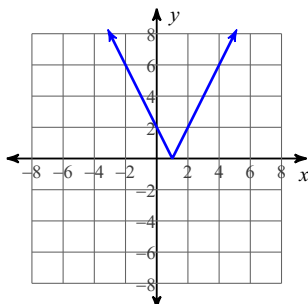
10)



11)



12)



13) compress vertically by a factor of 3
 translate right 1 unit

14) expand horizontally by a factor of 3
 translate left 3 units

15) reflect across the x-axis
 translate left 1 unit

16) compress horizontally by a factor of 3
 translate up 1 unit

17) $g(x) = -f(x) + 3$

18) $g(x) = \frac{1}{3} \cdot f(x) - 3$

19) $g(x) = f(x+3) - 1$

20) $g(x) = f(-x) + 2$

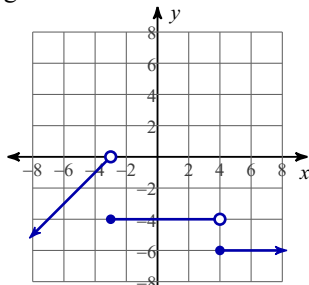
21) expand vertically by a factor of 3
 translate up 3 units

22) translate left 3 units
 translate up 1 unit

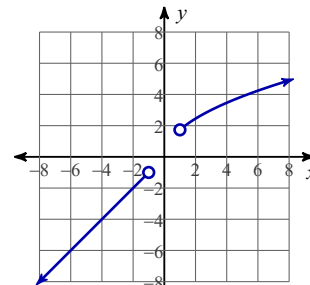
23) compress vertically by a factor of 2
 translate right 3 units

24) reflect across the x-axis
 translate right 3 units

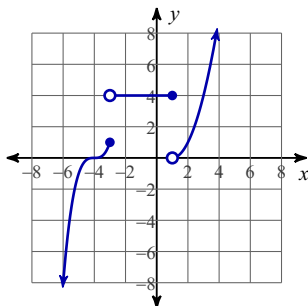
25)



26)



27)



28)

